Carnegie Mellon University Silicon Valley

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Managing Interoperability: What Happens When We Succeed?

Presenter

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Is Interoperable Radio The New "Party Line"?



The Telephone Doors of the Nation

A Few Things We Used To Get For Free...

Shared Situational Awareness

- Unit Assignments and Location (approximately)
- Operational Tempo
- Human Affect

Simple Routing

- Push-to-Talk
- Occasional User-Directed "Patching"

Localized Network Management

- Callsigns ("namespace")
- Codes and Procedures
- A-Priori Knowledge of Network Membership

Access Control

- Physical Security of Devices
- Type Acceptance
- Expense

... That Now We Have To Work For.

Creating Situational Awareness

- Person-to-person calling often replaces shared channel
- Data increasingly replaces voice

Managing Sophisticated Routing

- Who's who?
- Where in the network are they?
- How do we reach them?

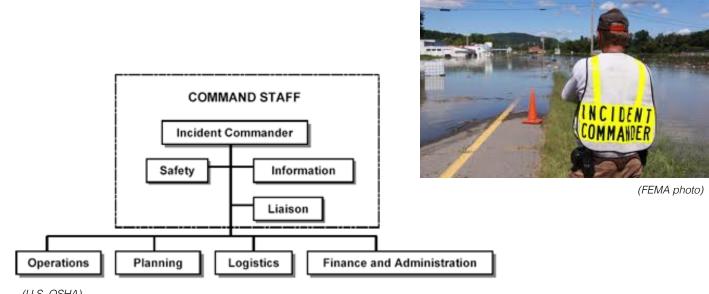
Globalized Network Management

- Mapping capabilities to entities
- Mapping roles to entities
- Global semantics and procedures

Access Control

- Encryption key management
- Identity management

We've embraced the Incident Command System (ICS)



But we still struggle with scale...



(NYPD)

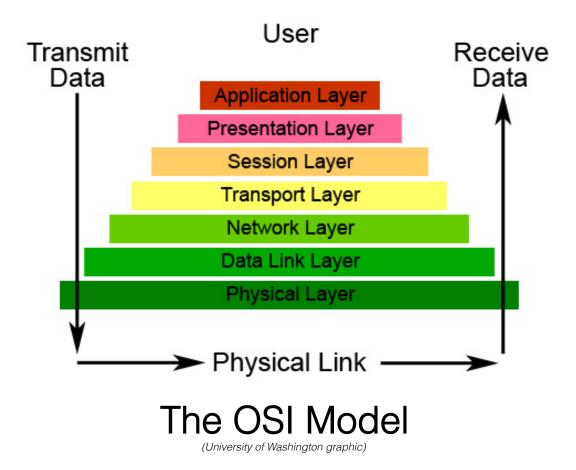


(NOAA)

...and with speed.

We've made great progress, but our work is not finished.

Thinking "Stackwise":



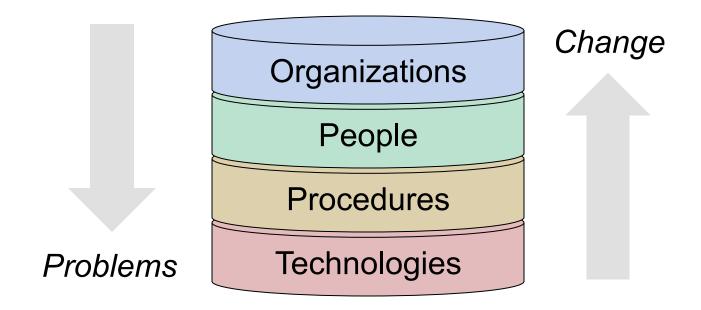
Thinking "Stackwise":

Governance	ng Areas Documentation	Individual Agencies Working Independently	Informal Coordinatio Between Agend	n Staf		Regional Committee Working within a Statewide mmunications Interoperability Plan Framework
Standard Operating Procedures	and Collaboration Among Areas nability of Systems and Documer	Individual Agency SOPs	Joint SOPs for Planned Events	Joint SOPs for Emergencies	Regional Set of Communications SOPs	National Incident Management System Integrated SOPs
, coming,	· .—	DATA SWAP ELEMENTS Files VOICE SWAP ELEMENTS RAdios	Common Applications Gateway	Custom-Interfaced Applications Shared Channels	One-Way Standards-Based Sharing Proprietary Shared System	Two-Way Standards-Based Sharing Standards-Based Shared System
Training & Exercises	Limited Leadership, Planning Minimal Investment in the Susta	General Orientation on Equipment and Applications	Single Agency Tabletop Exercises for Key Field and Support Staff	Multi-Agency Tabletop Exercises for Key Field and Support Staff	Multi-Agency Full Functional Exercises Involving All Staff	Regular Comprehensive Regionwide Training and Exercises
Usage	Limited L with Minimal Inv	Planned Events	Localized Emergency Incidents		gional Incident Management	Daily Use Throughout Region

The SAFECOM Continuum

(DHS graphic)

Thinking "Stackwise":



The Four Layers of EMCOMM

(Botterell circa 1989)

Challenges of Discovery and Management

Recognizing a new entity on the network

- Person-to-person calling often replaces shared channel
- Data increasingly replaces voice

Determining the entity's capabilities

- Competence: Certification, training, experience
- Capacity: Size, type and duration (expendables)
- Location and mobility

Assigning and updating roles

- Granting (and revoking) privileges
- Managing joint and shared roles
- Who can assign what to whom?

Authenticating communications

- Encryption and digital signatures
- All relies on credible identity
- So what is identity, anyhow?

Analogs From Computer Networking

- Domain Name System (DNS, wide area networks)
- Dynamic Host Configuration Protocol (DHCP, local area networks)
- Jini (Java objects)
- Session Announcement Protocol (SIP, largely telephony)
- Universal Description Discovery and Integration (UDDI, web services)
- WS-Discovery (web services)
- XMPP Service Discovery (for "Jabber")
- eXtensible Resource Descriptor Sequence (XRDS, OpenID, OAuth, etc.)
- The Semantic Web (distributed representation model)
- Google (central service model)

Who will choose an approach, and how?

Interoperability is a wonderful thing. Now where's the phone book?



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